

# Rediet Abebe

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Cornell University  
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**Interests** Algorithms, artificial intelligence, computational social science, and their applications to social good

**Academics** **Cornell University** Ithaca, NY  
Ph.D. Candidate in Computer Science Aug. 2015 – present  
Master of Science in Computer Science March 2018  
Committee: Professors Jon Kleinberg (Chair), Michael Macy, David Parkes & Kilian Weinberger  
Affiliation: Theory of Computing, AI, Policy, and Practice, and Center for the Study of Inequality

**Harvard University** Cambridge, MA  
Master of Science in Applied Mathematics Sept. 2014 – July 2015  
Advisor: Professor David Parkes  
Affiliation: The EconCS Group and Theory of Computation

**University of Cambridge** Cambridge, UK  
Master of Advanced Studies in Mathematics Oct. 2013 – June 2014  
Advisors: Dr. Felix Fischer & Professor Imre Leader

**Harvard University** Cambridge, MA  
Bachelor of Arts in Mathematics Sept. 2009 – May 2013  
Advisors: Professors Michael Hopkins & Richard Stanley

**Selected Fellowships, Awards, and Honors** Harvard Society of Fellows July 2019 –  
Award given to early stage scholars showing exceptional ability, originality, and resourcefulness

2019 Social Justice Award April 2019  
University-wide award presented for committment to promoting human rights, dignity and equity

Bloomberg 50 “One to Watch” Dec. 2018  
Recognition for people who defined global business in technology, science, finance, and entertainment

Facebook Scholarship Aug. 2017 – July 2019  
Award covering full stipend, tuition, and conference travel for 2 academic years

Google Generation Scholarship Aug. 2016 – May 2017  
Scholarship granted to outstanding aspiring computer scientists internationally

Graduate Resident Fellow, Alice Cook House Aug. 2016 – May 2017  
Leadership and mentorship position given to a select group of graduate students across the University

Cornell University Fellowship Aug. 2015 – May 2016  
Selective university fellowship awarded to outstanding incoming graduate students

Harvard-Cambridge Fellowship Oct. 2013 – June 2014  
Fully-funded year at the University of Cambridge given to 4 out of over 180 applicants

HHMI IDEAS Research Program May 2010 – May 2013  
Grant for students from underrepresented backgrounds for excellence in research

PBHA Stride Service Scholarship April 2010 & April 2011  
Award given for exceptional commitment to and leadership in public service

## Grants and Sponsorships

- Schmidt Futures for 3rd MD4SG Workshop (\$30,000) March 2019
- Institute for New Economic Thinking for 3rd MD4SG Workshop (\$1500) March 2019
- Schmidt Futures for 2nd MD4SG Workshop (\$12,000) March 2018
- Institute for New Economic Thinking for 2nd MD4SG Workshop (\$5000) March 2018

## Preprint

**Abebe, Rediet**, Jon Kleinberg, and S. Matthew Weinberg. “Subsidy Allocations to Disadvantaged Agents in the Presence of External Shocks.”

**Abebe, Rediet**, Richard Cole, Vasilis Gketzalis, and Jason Hartline. “A Truthful Cardinal Mechanism for One-sided Matching Markets.”

## Publications

**Abebe, Rediet**, Shawndra Hill, Jennifer Wortman Vaughan, Peter M. Small, and H. Andrew Schwartz. “Using Search Queries to Understand Health Information Needs in Africa.” *Proceedings of the International AAAI Conference on Web and Social Media (ICWSM)*, 2019.  
Preliminary version: *Workshop on Machine Learning for the Developing World (NeurIPS)*, 2017.

**Abebe, Rediet** and Kira Goldner. “Mechanism Design for Social Good.” *ACM AI Matters* 4.3 (2018).

Benson, Austin, **Rediet Abebe**, Michael T. Schaub, Ali Jadbabaie, and Jon Kleinberg. “Simplicial Closure and Higher-order Link Prediction.” *Proceedings of the National Academy of Sciences (PNAS)*, 2018.

**Abebe, Rediet**, Jon Kleinberg, David Parkes, and Charalampos E. Tsourakakis. “Opinion Dynamics with Varying Susceptibility to Persuasion.” *Proceedings of the 24th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)*, 2018.

**Abebe, Rediet** and Kira Goldner. “A Report on the Workshop on Mechanism Design for Social Good.” *ACM SIGecom Exchanges* 16.2 (2018).

**Abebe, Rediet**, Lada Adamic, and Jon Kleinberg. “Mitigating Overexposure in Viral Marketing.” *Proceedings of the 32nd AAAI Conference on Artificial Intelligence (AAAI)*, 2018.

**Abebe, Rediet**. “Computational Perspectives on Social Good and Access to Opportunity.” *In the ACM/AAAI Conference on AI, Ethics and Society (AIES)*, 2018.

**Abebe, Rediet**, Jon Kleinberg, and David Parkes. “Fair Division via Social Comparison.” *Proceedings of the 16th International Conf. on Autonomous Agents and Multiagent Systems (AAMAS)*, 2017.

Harding, Charles, Francesco Pompei, Dmitriy Burmistrov, H. Gilbert Welch, **Rediet Abebe**, and Richard Wilson. “Breast Cancer Screening, Incidence, and Mortality Across US Counties.” *JAMA Internal Medicine* 175.9 (2015): 1483-1489.

Trifunovic, Luka, Oliver Dial, Mircea Trif, James Wotton, **Rediet Abebe**, Amir Yacoby, and Daniel Loss. “Long-Distance Spin-Spin Coupling via Floating Gates.” *Physical Review X* 2:011006 (2012).

## Professional Activities & Service

**NIH Advisory Committee to the Director Working Group on AI, Member** Dec. 2018 – Working group charged with the task of identifying key challenges in exploring cross-disciplinary opportunities in AI and health and opportunities for the NIH to increase impact at this interface.

**Mechanism Design for Social Good, Co-founder and co-organizer** Sept. 2016 – Multi-institutional, interdisciplinary research initiative with the goal of using techniques from algorithm and mechanism design, in conjunction with insights from other disciplines, to improve access to opportunity for historically marginalized and under-served communities. Some initiatives include:

- A colloquium series highlighting exemplary work in the field
- Working groups focused on specific domains such as housing, inequality, and healthcare
- A partnership program to facilitate collaborations with policy-makers, NGOs, think tanks, and other stakeholders with a shared mission

**Black in AI, Co-founder and co-organizer** March 2017 – Transcontinental, interdisciplinary network of over 1000 researchers and practitioners in AI working together to share ideas, foster collaborations, and discuss initiatives to increase the presence and Black individuals in the field.

**Workshop Co-chair, Black in AI @ NeurIPS 2018** December 2018  
Co-chair for the 2nd Black in AI Workshop at NeurIPS, a workshop aimed at facilitating collaborations and discussing initiatives to increase the presence of Black researchers in the field of AI.

**Workshop Co-chair, ACM Conf. on Economics and Computation** June 2018  
Co-chair for the 1st and 2nd workshop on Mechanism Design for Social Good, an interdisciplinary workshop series, at the ACM Conference on Economics and Computation. The workshop is aimed at fostering interest in algorithmic and mechanism design problems with a social good objective.

**Workshop Co-chair, ACM Conf. on Economics and Computation** June 2017  
Co-chair for the 1st workshop on Mechanism Design for Social Good.

**Workshop Co-chair, Black in AI @ NeurIPS 2017** December 2017  
Co-chair for the 1st Black in AI Workshop.

### Program Committees

- ACM SIGAI Student Essay Contest on Artificial Intelligence Technologies Program Committee, 2019
- International Conference on Machine Learning (ICML 2019)
- Conference on Fairness, Accountability, and Transparency (FAT\* 2019)
- The Web Conference (TheWeb 2019), Social Networks & Graph Algorithms Track
- Workshop on Machine Learning for the Developing World NeurIPS 2018 (ML4D 2018)
- Workshop on AI for Social Good (NeurIPS 2018)
- IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems - External Review Committee, 2018
- The Web Conference (TheWeb 2018), Social Networks & Graph Algorithms Track  
*Best Reviewer: award given to 19 out of 1232 reviewers*
- Intl. World Wide Web Conf. (WWW 2017), Social Networks & Comp Social Science Track

<b>Invited Talks &amp; Presentations</b>	<b>Mechanism Design for Social Good</b>	
	• EmTech Digital MIT Technology Review, <i>San Francisco, CA</i>	March 2019
	• Rockefeller Foundation, <i>New York City, NY</i>	March 2019
	• Ashoka U Exchange, <i>San Diego, CA</i>	Feb. 2019
	<b>Gender Bias and AI</b>	
	Tilted: A Lean In Podcast, <i>New York, NY</i>	Nov. 2018
	<b>Diversity, Inclusion, and Bias in AI</b>	
	Artificial Intelligence and Journalism, <i>University of Syracuse</i>	Nov. 2018
	<b>AI in 21st Century Education</b>	
	University of Ottawa, <i>Ottawa, Canada</i>	Oct. 2018
	<b>Can Algorithms Reduce Inequality?</b>	
	TEDx Los Gatos, <i>Netflix HQ</i>	Sept. 2018
	<b>Youth Skills for Sustainability and Innovation</b>	
	World Youth Skills Day, <i>United Nations</i>	July 2018
	<b>Africa, Access to Opportunity, and AI</b>	
	62nd Session on the Commission on the Status of Women, <i>United Nations</i>	March 2018
	<b>Access to Opportunity and AI</b>	
	• The AI Element Podcast, <i>AI for Good</i>	July 2018
	• Salon 24: Artificial Imperfection, <i>Museum of Modern Art</i>	March 2018
	<b>Impacting Policy Through Computational Approaches</b>	
	Data Science for Social Good Workshop, <i>GaTech</i>	April 2019
	<b>Subsidy Allocations to Disadvantaged Agents in the Presence of Income Shocks</b>	
	• Department of Computer Science. <i>Brown University</i>	April 2019
	• Mobile Social Lab Seminar. <i>Columbia University</i>	March 2019
	• RAIN Seminar. <i>Stanford University</i>	Feb. 2019
	• Theory of Comp. Seminar. <i>Cornell University</i>	Feb. 2019
	<b>Computational Interventions to Improve Access to Opportunity</b>	
	• AI Seminar. <i>CMU</i>	Dec. 2018
	• Visiting Scholar Colloquium. <i>University of Pittsburgh</i>	Dec. 2018
	<b>Using Search Queries to Understand Health Information Needs in Africa</b>	
	• Statistical Challenges & Opportunities in HIV/AIDS Research Workshop. <i>NIH</i>	March 2019
	• Inclusion Seminar Series. <i>University of Maryland, College Park</i>	March 2019
	• CLSP Seminar Series. <i>Johns Hopkins University</i>	March 2019
	• Algorithmic Fairness and Opacity Working Group. <i>UC Berkeley</i>	Feb. 2019
	• CS Colloquium. <i>Cornell University</i>	Nov. 2018
	• AI Saturdays - Lagos. <i>Lagos, Nigeria</i>	Oct. 2018
	• Science for Social Good. <i>IBM Research, Thomas J. Watson Research Center</i>	Aug. 2018
	• ThursdAI. <i>Berkman Klein Center for Internet &amp; Society at Harvard</i>	March 2018

- Cornell Sociology Research Symposium. *Cornell University* March 2018

**Information and Overexposure in Word-of-Mouth Campaigns**

- *Stony Brook University, Department of Computer Science* Sept. 2018
- Theory Seminar. *University of Pennsylvania* April 2018
- DOS Optimization Seminar. *Georgia Tech* April 2018
- *AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society* Feb. 2018

**Mitigating Overexposure in Viral Marketing**

- Mining and Modeling Network Data. *SIAM Conf. on Discrete Mathematics* June 2018
- *The 32nd AAAI Conference on Artificial Intelligence* Feb. 2018

**Privacy and Poverty**

- Privacy Reading Group. *Georgia Tech* April 2018

**Fair Division via Social Comparison**

- Special Talk. *University of Chicago* Aug. 2018
- DOS Optimization Seminar. *Georgia Tech* April 2017
- Inequality Discussion Group. *Cornell University* April 2017
- Econ-CS Seminar. *Harvard University* May 2017
- Theory of Comp. Seminar. *Cornell University* May 2017
- New York Computer Science & Economics Day. *NYU, Stern School* May 2017

**Laplacian Eigenvalues of Simplicial Complexes**

- Mathematics Club. *Cornell University* April 2016
- Women in Theory Workshop. *New York University* May 2014
- Electric Flows, Graph Laplacians, & Algorithms Workshop. *ICERM* April 2014
- REU Invited Presentation. *University of Chicago* Aug. 2013

**Research and Internship Experiences**

**Cornell University** Ithaca, NY  
*Advisor:* Professor Jon Kleinberg July 2016 – present  
 Conducting research on algorithms, artificial intelligence, and applications to social good.

**Microsoft Research, Computational Social Science** New York City, NY  
*Mentors:* Dr. Jenn Wortman Vaughan and Dr. Shawndra Hill May 2017 – Aug. 2017  
 Used data-scientific techniques to understand health information needs of individuals to address health inequality between developing and developed nations.

**Microsoft Research, Theory Group** Cambridge, MA  
*Mentors:* Dr. Nicole Immorlica and Dr. Brendan Lucier May 2016 – Aug. 2016  
 Used computational and network science techniques to analyze behavioral patterns with focus on inequality on real-world networks.

**Harvard University** Cambridge, MA  
*Mentor:* Professor David Parkes August 2014 – July 2016  
 Studied allocation problems on social networks and opinion dynamics in social networks as a member of the EconCS group.

**Undergraduate Research & Summer School Experiences**

- **University of Chicago**, *Supervisor:* Prof. László Babai June 2014 – Aug. 2014

- **University of Chicago**, *Research Supervisor*: Prof. J. Peter May June 2013 – Aug. 2013
- **University of Minnesota**, *Research Supervisor*: Prof. Victor Reiner June 2012 – Aug. 2012
- **MIT**, *Research Supervisor*: Prof. Richard Stanley May 2011 – March 2013
- **Harvard University**, *Research Supervisor*: Prof. Michael Hopkins Spring 2012 & Fall 2012
- **Harvard University**, *Research Supervisor*: Prof. Richard Wilson Sept 2010 – May 2011
- **Harvard University**, *Research Supervisor*: Prof. Amir Yacoby May 2010 – Nov 2010

## Teaching Experience

**Cornell University** Ithaca, NY  
 Department of Computer Science, *Teaching Assistant* Spring 2018  
*Structure of Information Networks*. Hold weekly office hours to assist students with course material, homework, and projects. Guest lectures:

- Modeling Diffusion and Overexposure in Viral Marketing
- Can Cascades be Predicted? Virality and Growth in Cascades
- Resource Allocation Problems in Social Networks

**University of Chicago** Chicago, IL  
 Department of Mathematics, *Teaching Assistant* Summer 2013  
 Supervised research projects on probabilistic analysis of information-sharing protocols (presented at *QCrypt* 2014), irreducible representation of  $S_n$ , and book-embedding of  $k$ -partite graphs. Served as teaching assistant for a linear algebra and combinatorics course.

**Harvard University** Cambridge, MA  
 Department of Mathematics, *Teaching Fellow* Spring 2013  
 Worked with course head instructors to write weekly quizzes, problem sets, and exam problems. Held guided weekly remedial study and extra review sessions for a small group of students, and led a group of course assistants during weekly problem set sessions for all enrolled students.

Harvard Freshman Seminar, *Teaching Assistant* Fall 2010 & Fall 2011  
 Held Office hours and graded problem sets for a freshman seminar on “Calculating  $\pi$ ”.

## Leadership & Outreach

**Committees**

- **Computing and Information Sciences** May 2017 – May 2018  
 Work with the College Dean and faculty to better understand issues related to diversity and formulate and implement solutions as student representative in the Diversity Committee
- **Cornell West Campus House** Spring 2017  
 Interview and select the Flora Rose House Professor-Dean, who will serve as head of one of five residential houses on the Cornell West Campus House system
- **Harvard-Cambridge Fellowship** Feb. 2017  
 Interview and select four scholars for the 2017-2018 academic year

**Graduate School Recruitment Office** Ithaca, NY  
*Graduate Student Ambassador* Spring 2016 – Present  
 Assist in actively recruiting underrepresented minority and first generation students to the Cornell Graduate School through on and off campus recruitment events, sharing information, and answering questions from prospective graduate students.

**Alice Cook House** Ithaca, NY  
*Graduate Resident Fellow* May 2016 – May 2017  
 Supported House Professor-Dean, staff, and fellows to create an engaging, inclusive, and vibrant community in the undergraduate house through leadership and mentorship roles including: providing

academic support through weekly office hours, maintaining community standards, and building community by organizing numerous social and intellectual events each week.

**Cabot House**

*Tutor*

Cambridge, MA

Fall 2014 – Spring 2015

Held weekly STEM table for coursework assistance in math and computer science. Provided academic and career advising, including providing research program and fellowship applications.

**Selected Mentoring**

- **Underrepresented Minorities in Computing**, *Ithaca, NY* Sept. 2016 – Present
- **Women in Computing at Cornell**, *Ithaca, NY* Jan. 2016 – Present
- **Girls' Angle**, *Cambridge, MA* Sept. 2009 – May 2013
- **Cambridge After-School Program**, *Cambridge, MA* Jan. 2011 - May 2012
- **Franklin I-O Summer Program**, *Dorchester, MA* Summer 2011

**Selected Graduate-level Coursework**

**Graduate Level (Computer Science):** Machine Learning the Frontier, Advanced Topics in Machine Learning, Machine Learning for Data Science, Security and Privacy Technologies, Analysis of Algorithms, Topics on Computation in Networks and Crowds: Social Data Mining, Advanced Topics in Artificial Intelligence: Multi-Agent Systems, Bio-inspired Multi-Agent Systems, Topics in Cryptography and Privacy: Differential Privacy

**Graduate Level (Economics):** Mechanism Design and Approximation, Decision Theory

**Graduate Level (Mathematics):** Evolutionary Dynamics, Probability Theory and Stochastic Processes, Graph Limits Theory, Algebraic Topology, Algebraic Geometry, Commutative Algebra, Complex Analysis, Extremal & Probabilistic Combinatorics, Logic & Computation, Biostatistics, Mathematics of Operations Research, Designing Online Contests

**Graduate Level (Sociology):** Social Inequality: Contemporary Theories, Debates, and Models, Social Dynamics and Computational Methods, Seminar on Issues in African Development

**Skills**

*Languages:* Python, MATLAB, R

*More languages:* Amharic (fluent), English (fluent), French (proficient)

**Selected Press Coverage**

Forbes long feature on our work on search data for health in Africa

VentureBeat covering our work on search data for health in Africa

Cornell Chronicle covering our work on search data for health in Africa

MIT Technology Review feature on EmTech Digital keynote on AI for social good

The Guardian on AI ethics and bias

Rockefeller Foundation featured post on using data and technology for social good

Boston Globe interview on AI, bias, and diversity

Forbes featured article on why AI needs to reflect society

Bloomberg 50 feature as honoree for people who defined global business

Forbes interview on tech ethics wishes for 2019

Communications of the ACM article on my work through Mechanism Design for Social Good

Entrepreneur.com feature on my work through the Black in AI group

Levers in Heels – magazine highlighting African women in STEM – feature on research on AI for social good

Facebook Research Blog feature during Facebook Fellows Summit

Our JAMA Internal Medicine paper on Breast Cancer Screening, Incidence, and Mortality Across US Counties was covered by over 30 outlets – including FiveThirtyEight, The Huffington Post, US News, The Washington Post, NPR, The Baltimore Sun, and The LA Times, numerous statistical blogs, and a policy document from The National Academies Press.

Scientista Magazine student spotlight on my mathematical work and leadership as Editor-in-Chief of the Harvard College Math Review